

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **2001-079857**

(43)Date of publication of application : **27.03.2001**

(51)Int.Cl.

**B29C 33/72**

**B29C 33/58**

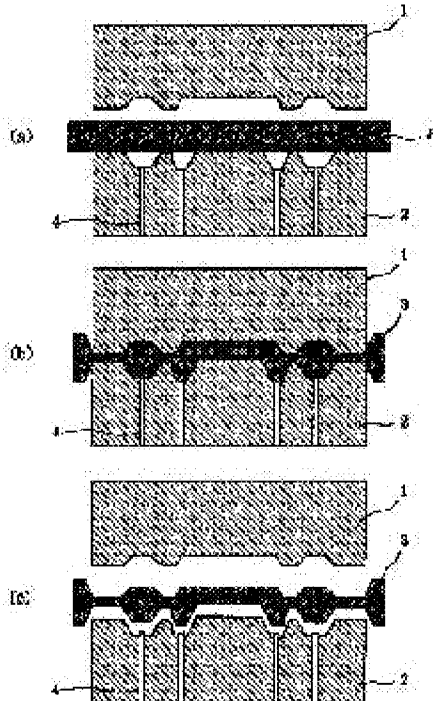
(21)Application number : **11-258348**

(71)Applicant : **HITACHI LTD  
HITACHI YONEZAWA  
ELECTRONICS CO LTD  
ASAHI KASEI CORP**

(22)Date of filing : **13.09.1999**

(72)Inventor : **TSUCHIDA KIYOSHI  
ITO MIKIHICO**

**(54) MOLD CLEANING SHEET, MOLD DEMOLDING RECOVERY SHEET,  
MOLD CLEANING METHOD, AND MOLD DEMOLDING RECOVERY  
METHOD**

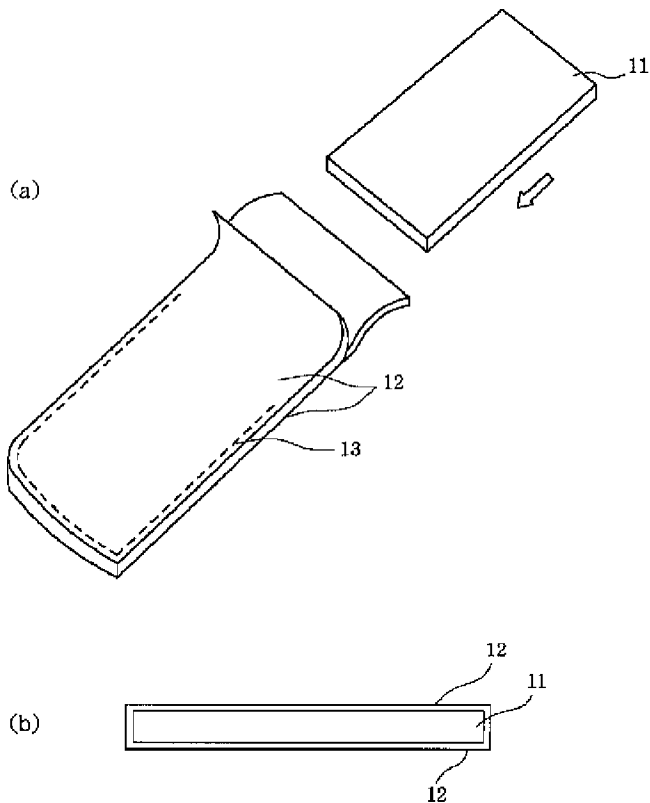


(57)Abstract:

**PROBLEM TO BE SOLVED:** To do thorough cleaning and demolding recovery of a cavity by a simple operation by using a mold cleaning sheet having at least an elastic layer and a surface layer made of a cellulose nonwoven fabric and a demolding recovery sheet.

**SOLUTION:** A sheet 3 thicker than a cavity is set/clamped between the first mold 1 and the second mold 2, and a clamping state is maintained for a given time. After that, the molds 1, 2 are opened, and the sheet 3 and adherent fouling are removed by an ejector pin 4. The sheet 3 has at least an elastic layer and a surface layer of a cellulose nonwoven fabric. A fluorocarbon resin, a polyolefin elastomer, SBR, BR, etc., are used for the elastic layer, and a long-fiber nonwoven fabric is preferable for the cellulose nonwoven fabric of the surface layer. A cleaning component such as cleaning resin, a

demolding recovery component such as a mold release agent, etc. are incorporated, as required, into the surface layer.



**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the sheet and method of using it conveniently for the cleaning method of metallic mold washing, a mold release recovery sheet, and a metallic mold and mold release recovery especially the object for transfer molding, and a compression mold.

[0002]

[Description of the Prior Art]Generally, dirt, such as a resin burr and oil, and dust, is accumulated in the surface of a forming mold and a cavity, a runner, and an air vent.

[0003]Since the phenomenon in which have an adverse effect on the quality of mold goods, and a mold-release characteristic falls will occur, such dirt has an object for \*\*

which a worker makes cleaning and mold release recovering work for a forming mold every fixed shot number.

[0004]However, since it is handicraft and the cleaning and mold release recovering work of a forming mold by a worker will require most time, the art in which cleaning and the mold release recovering work of the forming mold can be carried out for a short time is demanded.

[0005]Then, as what responds to such a request, for example to JP,6-254866,A, JP,1-95010,A, and JP,3-243310,A. The sheet member which consists of a cheesecloth, fire-resistant paper, a resin substrate, a network, etc. is clamped to forming mold face-to-face, and the method of carrying out the restoration solidification of the resin for cleaning in which the ingredient of dirt dropping like ammonia or formalin was mixed into a metallic mold, and releasing a sheet member and resin for cleaning from mold is indicated.

[0006]However, in these methods, there is an object for \*\* which performs work which there is an object for \*\* filled up with resin for cleaning in a metallic mold, and is different from the time of shaping, such as process control of the clearing work from molding resin to resin for cleaning, preservation of resin for cleaning accompanying it, inventory management, etc., as a result, and process control.

[0007]The cleaning method which makes the cleaning sheet which has the heat resistance and pliability which it impregnated with the ingredient which has a cleaning action in JP,9-70856,A, or the ingredient with a mold release operation as a means to solve this problem, on the other hand clamp between metallic molds is indicated.

[0008]However, in the method of starting, although cleaning of the metallic mold mating face was completed, since pressure transfer was not enough, a cleaning sheet could not arrive even at a metallic mold cavity surface easily, and there was a problem that the inside of a cavity could not fully be cleaned.

[0009]Since there was an object for \*\* which piles up several many sheet like objects, such as paper, cloth, and a nonwoven fabric, in order to make thickness of a sheet into the thickness more than a cavity and these sheets moreover were not usually reused, there was a problem also in cost.

[0010]

[Problem(s) to be Solved by the Invention]This invention solves the above-mentioned problem, and can perform washing sufficient to the inside of a cavity, and mold release recovery by simple operation, and an object of this invention is to provide the cleaning method and the mold release method of recovery of metallic mold washing, a mold release recovery sheet, and a metallic mold which can moreover reduce cost.

[0011]

[Means for Solving the Problem]This invention persons by combining an elastic layer which has a pressure transmission action, and a surface layer which consists of a cellulose nonwoven fabric which has detergency, as a result of inquiring wholeheartedly in view of the above-mentioned problem, A sheet could be made to reach to a cavity surface, and it finds out that thickness of a surface layer which is thrown away can be decreased, and came to complete this invention.

[0012]Namely, a cleaning method and the mold release method of recovery of a metallic mold using a metallic mold washing sheet which is characterized by that this invention comprises the following, a mold release recovery sheet, and this sheet.

It is an elastic layer at least.

A surface layer which consists of a cellulose nonwoven fabric.

[0013]

[Embodiment of the Invention] Hereafter, this invention is explained in detail.

[0014] Drawing 2 is a schematic diagram showing an example of the sheet of this invention, and the figure and drawing 2 (b) drawing 2 (a) explains an example of the manufacturing method of a sheet to be are a sectional view of a sheet. As for 11, in drawing 2, a surface layer and 13 are seal parts an elastic layer and 12.

[0015] The sheet of this invention has at least the elastic layer 11 and the surface layer 12 which consists of a cellulose nonwoven fabric.

[0016] As the elastic layer 11, especially if it has elasticity at ordinary temperature, it will not be restricted, but the sheet etc. which consist of fluoro-resin, a polyolefin elastomer, SBR, and BR, for example are mentioned. Also among these, repeated use is possible for a fluoro-resin sheet, and it is preferred. When using it for the mold public-funds type of a semiconductor chip, the sheet which does not contain chlorine and silicon is preferred.

[0017] Especially the cellulose content of the cellulose nonwoven fabric which constitutes the surface layer 12 is so preferred that a heat-resistant point to content is high although not limited, and consisting of cellulose 100% is more preferred. Although a staple fiber nonwoven fabric or a continuous glass fiber nonwoven fabric may be sufficient as a cellulose nonwoven fabric, since fluff does not arise but it excels in pliability, a continuous glass fiber nonwoven fabric is preferred.

[0018] The lamination of a sheet will not be limited especially if at least one outermost surface is the surface layer 12 which consists of a cellulose nonwoven fabric, but as shown in drawing 2, it is preferred that they are surface layer 12 / elastic layer 11 / surface layer 12. The cellulose nonwoven fabric impregnated if needed, other layers, for example, resin for washing, the cellulose nonwoven fabric impregnated with the release agent, etc. may be laminated between the surface layer 12 and the elastic layer 11.

[0019] Although the thickness of a washing sheet is suitably set up with the thickness of a metallic mold cavity, it is 7 to 12 times the cavity (package) thickness preferably.

[0020] Especially the ratio of the thickness of the surface layer 12 and the elastic layer 11 is a range which can reduce the cost concerning the surface layer 12, and what is necessary is not to be limited, to be able to demonstrate the pressure transmission action of the elastic layer 11 suitably, and just to set it up suitably.

[0021] The ingredient etc. which have the mold release recovery of radiation effect, such as an ingredient which has cleaning actions, such as resin for washing, if needed, and a release agent, in the surface layer 12 may be made to contain. Making these ingredients contain says the state where these ingredients do not secede from a surface layer simply in ordinary temperature. Although the method in particular of making these ingredients contain is not limited, the following methods are mentioned, for example.

[0022] (1) A method by powder processing. How to make it specifically weld with a heating roller after sprinkling powder-like resin for washing, and a release agent from on the original fabric of a nonwoven fabric.

[0023] (2) How to heat and evaporate moisture after making it suspended underwater and applying resin for washing, and a release agent to a nonwoven fabric.

[0024] As it is not limited, for example, is shown in drawing 2 (a), especially the manufacturing method of the sheet of this invention makes the surface layer 12 saccate

by the seal parts 13, such as sewing, may insert the elastic layer 11, may prepare it beforehand, and may pile both up in the case of metallic mold washing or mold release recovery.

[0025]Next, the method of this invention is explained using a drawing.

[0026]Drawing 1 is an outline sectional view explaining the method of this invention, and they are a figure in which drawing 1 (a) shows the state before washing, a figure in which drawing 1 (b) shows the state where the sheet was clamped, and a figure showing the state where the mold opening of drawing 1 (c) was carried out after the end of washing. As for the first metallic mold and 2, in drawing 1, a sheet and 4 are ejector pins the second metallic mold and 3 1.

[0027]This sheet 3 first, between said first metallic mold 1 of the forming mold which prepares the sheet 3 more than the thickness of a cavity as shown in drawing 1 (a), and consists of the first metallic mold 1 and second metallic mold 2, and the second metallic mold 2, the mating face of these first metallic molds 1 and the second metallic mold 2 -- it sets so that the whole region may be contacted mostly.

[0028]In this state, the second metallic mold 2 is turned to the first metallic mold 1, approach movement is carried out, and the sheet 3 is clamped as shown in drawing 1 (b). In the case of this approach movement, the dirt of the mating face of the metallic mold by friction with a metallic mold and the sheet 3 exfoliates. By what is done for fixed time maintenance where the sheet 3 is clamped with the first metallic mold 1 and second metallic mold 2. Since the resin burr and oil, and the dust adhering to the mating face of the metallic mold are dropped and also it is stuck to a surface layer by a cavity surface and the mold parting surface by the pressure transmission action of an elastic layer, the dirt, foreign matter, resin burr, etc. adhering to a cavity surface and a mold parting surface are dropped. The adhesion unification of the dirt which came off is carried out by the heat and pressure of a metallic mold at the sheet 3.

[0029]Then, as shown in drawing 1 (c), carry out descending movement of the second metallic mold 2, carry out a mold opening, the ejector pin 4 is made to project, and the dirt by which adhesion unification was carried out is taken out on the sheet 3 and its sheet after mold opening completion.

[0030]Although metallic mold washing and mold release recovery are made by the above method, In order to aim at further improvement in detergency and the mold release recovery of radiation effect, it is preferred to perform metallic mold washing using the sheet 3 containing an ingredient with a cleaning action, and to perform mold release recovery of a metallic mold using the sheet 3 containing the ingredient which has the mold release recovery of radiation effect after that. Of course, the publicly known mold release method of recovery may be enforced after the cleaning method of this invention, and the mold release method of recovery of \*\*\*\*\* may be enforced after a publicly known cleaning method.

[0031]this invention -- a molding die -- although it is generally widely applicable, it can be used especially conveniently for washing of the object for transfer molding, and a compression mold, and mold release recovery.

[0032]

[Example](EXAMPLE) Washing work transfer-molding public-funds type [ for semiconductor closure ] was performed in the following procedures.

[0033](1) The sheet shown in drawing 2 which has the thickness more than a cavity was

used.

[0034]The first sheet used the thing which made resin for washing contain in cellulose 100% of a continuous glass fiber nonwoven fabric for the surface layer, and used the olefin elastomer (ethylene octene copolymer) for the elastic layer.

[0035]The second sheet used the thing which made the release agent contain in cellulose 100% of a continuous glass fiber nonwoven fabric for the surface layer, and used the olefin elastomer (ethylene octene copolymer) for the elastic layer.

[0036](2) the first sheet was inserted in the procedure which the metallic mold after 1,500-shot production is opened, and shows a product in drawing 1 -- it back-clamped and this was repeated twice. Then, in the procedure shown in drawing 1, it clamped, after inserting the second sheet.

[0037]A result is shown in Table 1.

[0038](Comparative example) The same equipment as an example washed the product, the metallic mold after 1,500-shot production was washed by the conventional method, and the mold-release characteristic was given.

[0039](1) After inserting copper dummy flames in a metallic mold, tablet-like resin for washing was made to transfer. The metallic mold was opened and the resin for washing solidified in a frame was removed. This was repeated 5 times.

[0040](2) After inserting copper dummy flames in a metallic mold, the mold-release characteristic tablet was made to transfer succeedingly. This was repeated twice.

[0041]A result is shown in Table 1.

[0042]

[Table 1]

	実施例	比較例
製品表面	良好	良好
離型性	良好	良好
ダミーフレームロス	0 枚	7 枚
洗浄用樹脂ロス	0 g	2 5 0 g

[0043]

[Effect of the Invention]According to this invention, it writes like explanation above with the sheet which combined the elastic layer which has a pressure transmission action, and the surface layer which consists of a cellulose nonwoven fabric which has detergency, A sheet can be made to be able to reach to a cavity surface and washing sufficient to the inside of a cavity and mold release recovery can be performed. And since cost can also be reduced since the thickness of the surface layer which is thrown away can be decreased, and also resin and a metallic frame are not used, it can destroy by fire and is effective as an environmental measure.

---

[Translation done.]